

Syllabus
BIS3061 Internet of Everything
Kevin Johnston
Summer Semester 2024

Level	Bachelor
Credits	3 ECTS-credits
Student Contact Hours	90
Workload	The workload for course corresponds to 3 ECTS-credits for a total of about 90 hours.
Prerequisites	Proof of English language skills. A laptop with a microphone and camera, high-speed internet, Moodle and MS Teams.
Time	Fridays from 17:45 to 18:45, PLUS three Saturdays 20 & 27 April and 04 May
Rooms	Mondays on MS-Teams and in W4.2.01, W4.2.04, W4.1.06, and W4.20. 2 on campus
Start Date	Friday 22 March 2024
Lecturer	Name Kevin Johnston
	Office W4.1.1
	Virtual Office MS Teams
	Office Hours Fridays from 16:00 to 17:00 by appointment
	Phone +27 (83) 415 0892
	Email k.johnston@lb.hs-pforzheim.de or kevin.johnston@uct.ac.za

1. Summary

The course aims to provide students with an understanding of the complexities and issues involved in the Internet of Everything (IoE) which facilitates the integration of seemingly disconnected Internet of Things (IoT) technologies and applications. The Internet of Things (IoT) is a major subset of IoE is continually expanding, and business and IT professionals need to understand what IoE/IoT is, how it works, what is the potential of IoE/T, and how to use IoE/T to improve business. The course will examine the broad concept of IoE/T in business, then the sensors and devices (the 'things') that make up the IoE/T, how these things are programmed, how the data is gathered and analysed, how the components are networked together, how cybersecurity is handled, and where the components sit. Then how to manage IoE/T projects and the change they create, how to manage innovation, and how to design will be briefly addressed. Finally, the challenges and value add of IoE will be examined.

2. Outline of the Course

The course is based on the Internet of Everything (IoE), information technology and management issues as at 2024.

All students will be expected to participate in the discussions, and will be evaluated on their contributions made in class. All students are expected to bring **AT LEAST ONE mobile device** to each seminar, which **MUST** be on at all times.

All students will be expected to read, research, pose **problems** and questions, develop and **submit answers** to questions in class. The instructor may give guidelines and additional literature sources.

One or more students will be pre-selected to source a **video (maximum of 4 minutes)** which explains the topic, and to generate a relevant question related to the topic. The question must be submitted to a version of ChatGPT for an answer. The student(s) must then Appraise (judge) the answer supplied by ChatGPT based on several key factors.

DURING each Seminar (90 minutes):

1. The instructor will usually give a **lecture of maximum 45 minutes**. The lecture will provide theoretical background and raise questions.
2. The pre-selected student(s) will then show a **4-minute (maximum) video** they have sourced on the topic to the class.
3. The pre-selected student(s) will then show the Question they generated to a version of ChatGPT, plus the Answer and their Assessment of the answer.
4. There will then be an **open session of maximum 10 minutes** to discuss, ask and answer questions on the **topic**.
5. There will then be exercises and/or activities for **30 minutes**.

The seminar approach is based on interactivity, so each student should come prepared by having read the reading(s), and prepared answers and questions.

3. Course Intended Learning Outcomes and their Contribution to Program Intended Learning Outcomes / Program Goals

Note: Where Learning Outcomes share an assessment, the percentage for that assessment is only shown the first time the assessment is mentioned.

Program Intended Learning Outcomes	Course Intended Learning Outcomes	Assessment Methods			
		Presentation	Project	Essay	Workshops
After completion of the program the students will be able...	After completion of the course the students will be able	50%	20%	10%	20%
		Collective	Individual	Individual	Collective
		Project	D&Q,Video	Reflect	DS & DT
1 Expert Knowledge					
1.1 ...to demonstrate their distinguished and sound competencies in General Business Administration.	... to understand what the Internet of Everything (IoE) is about. ... to appreciate how IoE can add value in businesses.	X			
1.2 ...to solve business problems based on profound data research skills and by applying quantitative methods.	... to explain the relationship between business requirements and the potential of IoE solutions ...to demonstrate research skills in asking and answering questions in class, developing presentations, in sourcing videos, and in using ChatGPT.	X			X
2 Digital Skills					
2.1 ...to know and understand relevant IT software tools used in business and their features and have a solid understanding of digital technologies.	...to identify the current sensors and devices available and in use in IoE ...to be aware of the programming and software required in IoE ...to understand and apply design and design concepts concerning IoE ... to appreciate and be able to apply Big Data, Analytics and Business Intelligence in IoE projects ... to appreciate the networks, and standards associated with IoE projects ... to understand where IoE exists, both in and on the edge of the cloud ... to understand and be able to apply Project and Change Management ... to have an understanding of Innovation Management	X	X		X
2.2 ...to effectively use and apply information systems to develop solutions in business settings.	... to develop and present an innovative IoE project	X			
3 Critical Thinking and Analytical Competence					
3.1 ...to implement adequate methods in a competent manner and to apply them to complex problems.	... to work in teams through two workshops, one on Design Thinking and one on Data Science.				X

3.2	...to critically reflect and interpret findings and to develop comprehensive solutions for complex problems.	... to submit four individual reflections at various stages of the course			X	
4 Ethical Awareness						
	...to develop sound strategies in the areas of ethics, sustainable development and social responsibility and are able to apply them to typical economic decision-making problems.	... to appreciate issues of privacy and the need for ethical behaviour, and to understand and develop strategies to deal with these issues. ... to identify and analyse loE security and privacy risks	X			
5 Communication and Collaboration Skills						
5.2	...to demonstrate their oral communication skills in presentations.	... to work in a team to create and present an loE concept design that solves a problem, is ready to prototype and test.	X			X
5.3	...to work successfully in a team by performing practical tasks.	... to work in a team to create and present an loE concept design that solves a problem, is ready to prototype and test.	X			X
6 Internationalization						
6.1	...to understand and explain business challenges in an international context.	... to understand challenges in designing, implementing, and managing loE	X			X
6.2	...to articulate themselves in a professional manner in international business.	... to work in a team to create and present an loE concept design	X			X

4. Teaching and Learning Approach

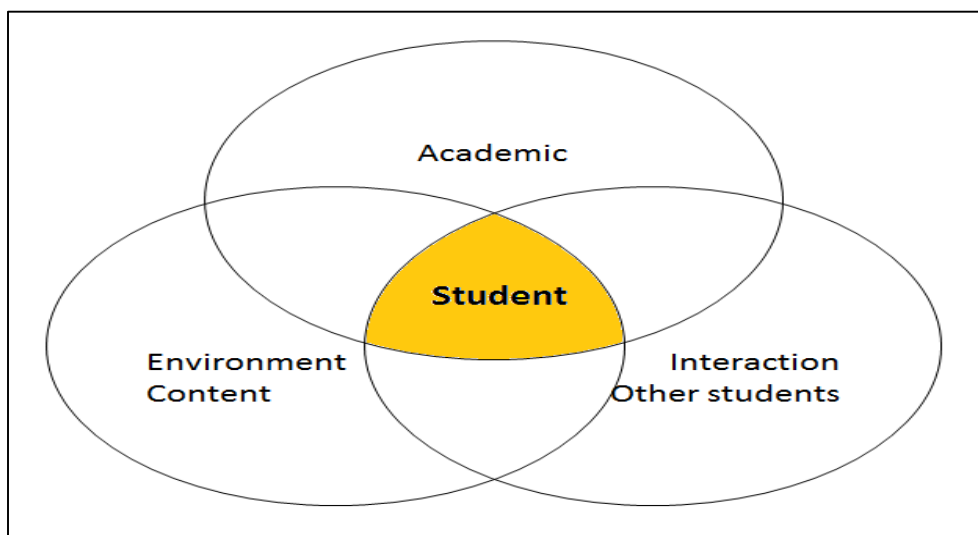
I expect each of us to learn and grow during our time together. I do not believe anyone knows all the answers, but I believe that everyone has questions. I believe that learning begins with an inquiry, with questions. I hope to get students to develop and ask questions that stimulate debate, provoke reflection, get useful information, and initiate action.

I believe that there are no stupid questions, only stupid answers. I wish to make students comfortable to ask insightful questions.

If you have any problems or questions, please speak up, or e-mail as soon as you possibly can. The longer you wait the fewer options we have to help you.

The course is as Green as possible, there are no paper hand-ins or hand-outs – all deliverables and documents are electronic on Moodle.

The course follows a constructivist learning approach, which puts the student at the centre of active learning as shown below. Learning is not a passive activity in which students acquire knowledge, rather it is an active approach in which students find, contextualize and process information to construct knowledge. The student is expected to draw on their personal experiences, interact and draw on the personal experiences of fellow students, interact with the academic, and the environment to source information and to develop knowledge.



This course uses five approaches to ensure the student is active in constructing knowledge.

1. Supported learning – providing scaffolding and bite-sized chunks plus feedback. Students are provided with readings.
2. Exploratory learning – students are encouraged to explore and discover new knowledge, to source videos.
3. Collaborative learning – students obtain multiple perspectives and critical thinking skills, and collaborate in teams to produce presentations.
4. Problem-based learning – students are encouraged to post problems, questions as well as answers on the topics.
5. Evidence-Based Management (EBM) or practice, which uses four main sources of evidence: Scientific literature, Professional expertise, internal organisational data, and Stakeholders values and concerns. The EBM approach is Ask, Acquire, Appraise, Apply and Assess.

5. Literature and Course Materials

There is no prescribed textbook; students are expected to find and read a range of Journal articles and academic literature on the internet. The course is based on the issues raised in academic and industry research. Students will need at least one mobile device connected to the internet in all classes.

6. Assessment

1	Discussion & Questioning in class	10%	In class
2	Individual Reflections	10%	24 hours after last lecture
3	Video & ChatGPT in Seminars (1 per student)	10%	24 hours prior to seminar
4	Workshops (2 team workshops)	20%	6 hours after workshop
5	Project Presentation (in teams)	50%	12h00 on 07 June
	Total	100%	

Marks are gained from each activity performed.

6.1 Discussion & Questioning in Class (10%)

Participation by students in discussions and questioning in class is core to this course. **All students are expected to participate in the DISCUSSION & QUESTIONING in class. Students may pose questions, and or propose answers** relevant to the topics under discussion. Students should be prepared to ask questions and give answers. All students will be expected to participate in ALL of the discussions, and will be evaluated on their submissions. Asking questions is an important part of this course. Students will not gain marks simply by asking an obligatory question or two, nor will marks be based on the number of questions or comments made. Marks will be gained by asking open ended questions which cause fellow students to think and grow. Participation grades will reflect the total impact the student has had on the class over the course, through significant and insightful comments, and a demonstration of good problem-solving and analytical skills.

Students may also ASK questions related to the lecture, and ANSWER questions posed via email.

Each question and answer will be assessed and given a mark (1-5), based on the following criteria:

5 - Excellent, demonstrates knowledge, understanding, insight, and or creativity.

3-4 - Very good, could be clearer and or shorter but covered some key points, shows some knowledge of the subject matter, perhaps some application.

1-2- Shows some knowledge of the subject matter, but no application.

0- No Submissions.

6.2 Individual Reflections (10%)

Reflection is not simply reporting events or presenting the opinions of others. Reflection is your **OPINION**, your **THOUGHTS**, your **FEELINGS**, your **OBSERVATIONS**, reflection shows some analysis, explores motives for views/behaviour, reflection can be critical of views/actions. Reflection contains an element of 'standing back' from an event/issue, and reflection recognizes that one's frame of reference can change. Reflection also takes the views and motives of others into consideration and considers them against one's own views and motives. Reflection recognizes that previous experience, thoughts, socialization, background etc., interact with the production of one's own behaviour.

Reflective practice is an essential skill, and one that is often overlooked by those in a position of leadership.

Reflection recognizes that previous experience, thoughts, socialization, background etc., interact with the production of one's own behavior. Students are expected to submit a reflection piece (maximum 300 words) **by Monday, 10 June 2024**. All students are invited and encouraged to **reflect on issues** such as:

- a. What are the two-four most important things I learned in this course?
- b. Did the course change any of my opinions, which ones, and how?
- c. What outstanding questions or unaddressed critical issues do I have?

An interesting site to look at is <https://www.reboot.io/>.

An interesting book to read is Colonna (2019). Colonna, J. (2019). Reboot. Leadership and the art of growing up. Harper Business, New York.

Reflection requires us to think about the past, in the present, and apply what we are learning to the future.

Each reflection will be assessed and given a mark (5-0), based on the following criteria:

5 - Excellent, critical reflection which takes account the socio-political context in which events take place and decisions are made (roles, relationships, responsibilities, gender, ethnicity, etc.).

3-4 - Good, a reflection which is a form of discourse with one's self, mulling over reasons and exploring alternatives (I wonder...? perhaps ...? maybe...?) and which provides reasons (often based on personal judgement), although only in a reportive way (I did x because y).

1-2- Fair, descriptive, but not reflective, merely reporting events with no attempt to provide reasons (I did x; s/he said y).

0- No reflection.

6.3 Video &/or ChatGPT in Seminars (10%)

The selected student(s) must carry out a focused search for a **recent** and **relevant** academic/business video which contains a succinct, focused and relevant **contextualization** and **definition** of the topic. The **URL** of the Video plus **CRAP** test (Currency, Reliability, Authority, Purpose/Prejudice) must be emailed to the academic at least **24 hours prior to the seminar**.

Videos will be marked according to the following table:

Excellent 5	Very Good 4	Good 3	Fair 2	Poor 1
An excellent video containing a succinct focused and relevant contextualization and definition. Key concepts identified and explained.	A very good video containing clear and relevant contextualization and definition. Key concepts identified and explained.	A good video containing good contextualization and definition. Key concepts identified and explained, with a small amount of irrelevant material.	A video which is weak in contextualization, and definition. Key concepts not clearly identified or explained.	A poor video which is unclear or poor in contextualization, and definition. A fair amount of irrelevant material.

The selected student(s) must generate a **relevant question** related to the **topic**. The question must be submitted to a **version of ChatGPT** for an answer. The student(s) must then **Appraise (judge)** the answer supplied by ChatGPT based on the **CRAP** test (Currency, Reliability, Authority, Purpose/Prejudice).

By evaluating an answer based on the CRAP test, one can determine its quality and accuracy, and make an informed decision about how well it answered the question.

Appraisals will be assessed according to the following table:

Excellent 5	Very Good 4	Good 3	Fair 2	Poor 1
Excellent appraisal containing a succinct, focused and relevant determination of answers quality and accuracy, and an informed decision about how well it answered the question.	Very good appraisal containing a clear and relevant determination of answers quality and accuracy, and an informed decision about how well it answered the question.	Good appraisal containing a good determination of answers quality and accuracy, and a decision about how well it answered the question.	Weak appraisal which failed to determine the answers quality and accuracy, and a poor decision about how well it answered the question.	Poor appraisal which failed to determine the answers quality and accuracy, and a poor or no decision about how well it answered the question.

The **Question** to a version of ChatGPT, plus the **Answer** and the **Assessment** of the answer must be emailed to KJ 24 hours prior to the seminar.

6.4 Workshop Submissions (20%)

The two workshops involve teamwork. Marks for teamwork is to be **shared equally** among all members of the team. Students will work in teams to complete and submit work for two workshops. Each workshop is to count 10% to the total mark. Details of each workshop will be handed out in the seminar, together with a document to submit work completed. The deadline for document **submission will be 6 hours after the workshop** – no late submissions will be considered. An important aspect of the deliverable is how the data is managed and organized.

Each workshop will be assessed and given a mark (1-5), based on the following criteria:

5 - Excellent, demonstrates knowledge, understanding, insight, and or creativity.

3-4 -Good answer, most points covered, shows some knowledge of the subject matter, perhaps some application.

1-2- Shows some knowledge of the subject matter, but little to no application.

0- No submission.

6.5 Project Presentation (50%)

Marks for teamwork and team presentations are to be **shared equally** among all members of the team. Students will work in project teams to become familiar with the relevance of IoE/T. Students are NOT expected to actually BUILD or CREATE anything, so do not need to spend any money. The presentations should be **structured**, and **applied**, and include an **e-Poster**. The presentations may use relevant theory or models. The presentation must be completed in a maximum of 20 minutes. **Presentations and e-Posters must be emailed to KJ by 12h00 on Wednesday 05 June 2024.** Points are awarded based on a 5 (or 10) point scale, where 1=poor, 2= fair, 3= approaches expectation, 4= meets expectation, and 5= exceeds expectation.

Issue	Mark
Presentation (20%)	/20
Visual Aids/Delivery	1-5
Structure – introduction, conclusion, storyline	1-5
e-Poster - Title, Aim/motivation, Value	1-5
Time Keeping (maximum 20 minutes)	1-5
Content (80%)	.../80
Overview & Architecture (Background, creative idea, problem statement, purpose, business, justification, potential benefits, architecture)	1-5
Project Management (a clear statement about the PM you plan to use, a project plan, triple constraints)	1-5
Empathy Map of a typical user(s)	1-5
COLLECT - Devices (clear statement of sensors and devices (Things) to be used, for what should be related to the problem & realistic)	1-10
CONNECT - NW & CLOUD (clear statement of how Things associated with the project are to be connected, Platform you plan to use, What CC and Edge you plan to use and why?)	1-10
ANALYSE – Big Data, Analytics, Programming & Software (clear statement of the analysis and Insights expected for the IoE/T project)	1-10
ACT – Programming, Software & Business Intelligence (clear statement of what SW you plan to use and for what, Business Intelligence and Actions expected for the IoE/T project)	1-10
Security & Privacy -(a clear statement about the security and privacy implications of the IoE/T project)	1-5
Discarded ideas - other ideas that discarded during the ideation process	1-5
Value, benefit, and innovation of IoE/T Project - expected contributions (WIIFM?), Rough cost estimates	1-5
Other Submissions – PM, IoT Game, DT, Flowchart, Risk etc	1-10

7. Schedule

The planned schedule is as follows (Days in **Orange** are via MS Teams, and Days in **Green** are in Pforzheim):

Day; Date; Times	Room	#	Topic [90 min each]
Fri; 22/03; 17:15 18:45	Teams	1	Intro/Preliminaries/Project allocations
Fri; 05/04; 17:15 18:45	Teams	2	Architecture & Business Processes
Sat; 20/04; 10:00 11:30:	W4.2.01	3	Project Management & Draft
Sat; 20/04; 11:30 13:00	W4.2.01	4	Innovation Management & IoT Game
Sat; 20/04; 13:45 15:15	W4.2.01	5	UI, UX, CX & Design Thinking
Fri; 26/04; 17:45 18:45	W4.2.04	6	Design Thinking Workshop
Sat; 27/04; 10:00 11:30	W4.2.04	7	Sensors & Devices
Sat; 27/04; 11:30 13:00:	W4.2.04	8	Networks & Platforms
Sat; 27/04; 13:45 15:15	W4.2.04	9	On the Edge of the Cloud. Q&A
Sat; 04/05; 10:00 11:30	W4.1.06	10	Programming & Software
Sat; 04/05; 11:30 13:00	W4.1.06	11	Big Data, BA, BI & DS
Sat; 04/05; 13:45 15:15	W4.1.06	12	Security & Risk
Fri; 10/05; 17:15 18:45	W4.2.02	13	Value
Fri; 31/05; 17:15 18:45	Teams	14	Privacy & Ethics
Wed; 05/06; 12:00			Presentations and e-Posters must be emailed to KJ by 12h00
Fri; 07/06; 17:15 18:45	Teams	15	PRESENTATIONS
Mon; 10/06; 12:00			Submission of Reflections

8. Academic Integrity and Student Responsibility

The University considers **plagiarism** to be the **deliberate passing off of another person's work as though it was your own**, and will **NOT be tolerated**. **At the very least, you would get zero for your work, and we would request that you withdraw** from the Course.

Since so much of the course mark is awarded for work done outside of our direct control, a great deal of trust is involved. We, therefore, view plagiarism in the same way as we do cheating in examinations. Similar rules apply to all student work such as projects, essays and other assignments.

Some examples of what we would consider being plagiarism are:

- You **downloaded** material from the Internet and submitted it as your own work
- You downloaded material from the Internet and **copied** whole **paragraphs** or pages of text into your assignment, but you edited them slightly so they fitted in. You might have written other parts of the assignment yourself, but chunks of it are made up of copied material.
- You found a few articles or books that say everything you need. You designed the structure of the assignment yourself and wrote quite a bit of it. But one or two sections are almost **word-for-word** from the articles or books you used. You did this because they said things in a way you felt you could not improve upon.
- You acquired assignments from previous year's students and used them in the manner described above.

- Someone else wrote all (or part of) the assignment or project for you, either as a favour or for some kind of reward.
- Falsifying or manufacturing (creating) of any data.
- Using AI tools such as ChatGPT without acknowledging the tool(s).

So what would the consequences of plagiarism be? At the very least, you would get **zero for your assignment/submission**, you will have to **appear before the Dean**, and we would request that you **withdraw from the Course**. In cases where blatant copying has taken place, we would take disciplinary action, which could result in **suspension or expulsion** from the University.

What is acceptable?

Part of the objective of the course is for you to find lots of other material. All we ask is that you use it in an ethical, honest and scholarly way. This requires you to be able to analyse and discuss a broad selection of the material you found, and that you *reference* the material you use!

Acceptable use of another person's material at undergraduate level means that the assignment structure, layout and contents are all your own work. AND

- You used no more than one directly quoted paragraph per page, and you referenced the author as per APA 7th guidelines
- You used ideas, phrases, concepts, diagrams and statements already stated by others, but you rewrote them in your own words AND you referenced them
- You have quite a lot of references on each page, but they are taken from several different sources. (If they are all from the same source, then you have relied too heavily on that source!)

9. Code of Conduct for online Teaching

[Link to the Code of Conduct for online Teaching](#)

10. Teaching Philosophy

The course follows a constructivist learning approach, which puts the student at the centre of active learning as explained in the Teaching and Learning Approach section.

11. Additional Information

Prof. KA Johnston will be available before and after seminars. For a meeting please email k.johnston@lb.hs-pforzheim.de or kevin.johnston@uct.ac.za or WhatsApp +27 (83) 415 0892.

12. Disclaimer

While every effort has been made to be as accurate as possible in this document, it sometimes happens that changes occur – particularly dates. If in doubt, please check with Kevin Johnston or the Course Administrators.